Claims

1. A protein GCS shown in the following (A) or (B):

(A) a protein having an amino acid sequence shown in SEQ. ID No. 2 in the sequence listing,

(B) a protein consisting of an amino acid sequence comprising substitution, deletion, insertion, addition, or inversion of one or several amino acids in an amino acid sequence shown in SEQ. ID No. 2 in the sequence listing and having a function of enhancing temperature tolerance.

2. A DNA of a gene encoding a protein GCS shown in the following (A) or (B):

(A) a protein having an amino acid sequence shown in SEQ. ID No. 2 in the sequence listing,

(B) a protein consisting of an amino acid sequence comprising substitution, deletion, insertion, addition, or inversion of one or several amino acids in an amino acid sequence shown in SEQ. ID No. 2 in the sequence listing and having a function of enhancing temperature tolerance.

3. The DNA of a gene according to claim 2, which is a DNA shown in the following (a) or (b):

(a) a DNA that comprises a nucleotide sequence consisting of nucleotides 73 to 1251 within the nucleotide sequence shown in SEQ. ID No. 1 in the sequence listing,

(b) a DNA that hybridizes with a probe comprising a nucleotide sequence consisting of nucleotides 73 to 1251 within

the nucleotide sequence shown in SEQ. ID No. 1 in the sequence listing or a part thereof under a stringent condition, and encodes a protein having a function of enhancing temperature tolerance.

4. A microorganism whose temperature tolerance is enhanced by amplifying the intracellular copy number of the DNA according to claim 2 or 3.

5. The microorganism according to claim 4 characterized in that the microorganism is an acetic acid bacterium belonging to the genus Acetobacter or the genus Gluconacetobacter.

6. A method of producing vinegar characterized by culturing a microorganism having alcohol oxidation ability among the microorganisms according to claim 4 or 5 in a medium containing alcohol, whereby acetic acid is produced and accumulated in the medium even at a high culture temperature.

7. A recombinant plasmid pUCGCS (FERM BP-8217) including at least the DNA according to claim 2 or 3.